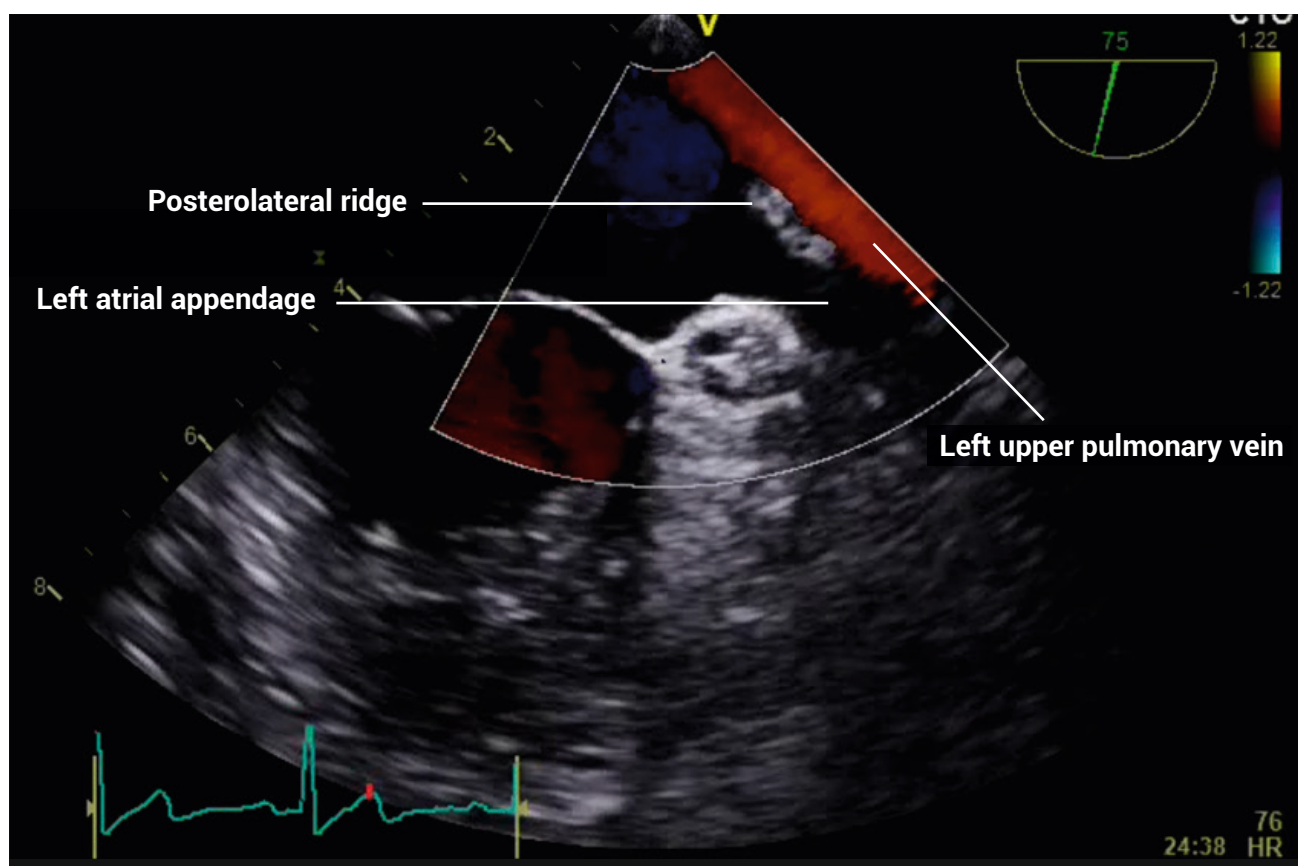


TEE ESSENTIALS

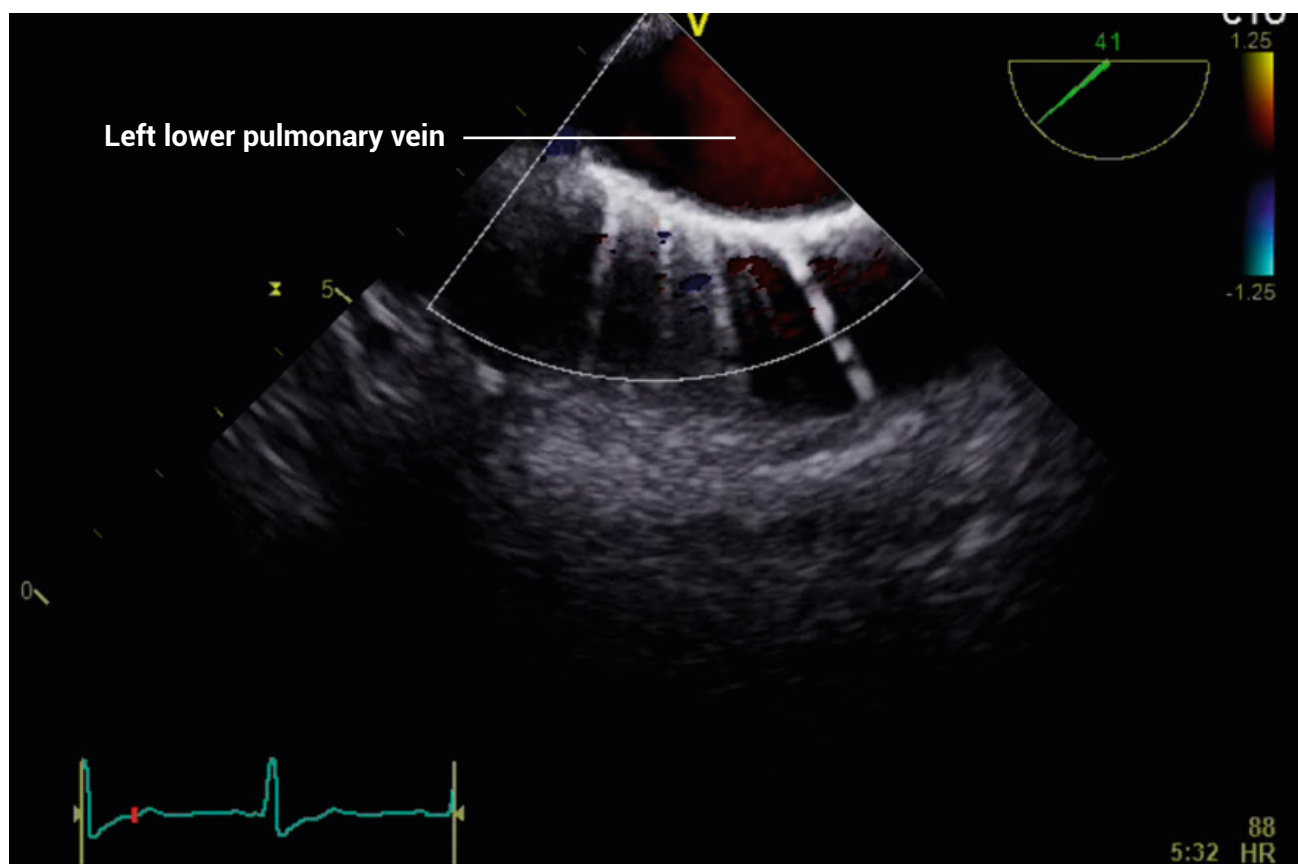
Assessment of the pulmonary veins: The left-sided pulmonary veins

To locate the left upper pulmonary vein (LUPV), start with a mid-esophageal four-chamber view with a transducer angle of 0–20°. Focus on the left atrium, and turn the probe to the patient's left. It can be helpful to have color Doppler switched on from the outset, to make identification of the LUPV easier from its flow pattern. The LUPV inserts relatively vertically into the left atrium (compared to the left lower pulmonary vein, which inserts more horizontally). Once you have located the LUPV, adjust the transducer angle as necessary to show it clearly with no foreshortening.

The LUPV lies adjacent to the left atrial appendage, with the posterolateral ridge (ligament of Marshall) separating the two.



To locate the left lower pulmonary vein (LLPV), advance the TEE probe a little further into the esophagus and turn the probe further to the patient's left. Again, you may need to adjust the transducer angle to optimize the image.



Use color Doppler to visualize flow in both the LUPV and LLPV, and perform pulsed wave Doppler 1 cm into the mouth of any two pulmonary veins (left- or right-sided) to assess flow patterns. Systolic flow reversal (i.e., a retrograde rather than antegrade S wave flow pattern) in a pulmonary vein is a specific indicator of severe mitral regurgitation.

Further reading

Hahn RT, Abraham T, Adams MS, et al. 2013. Guidelines for performing a comprehensive transesophageal echocardiographic examination: Recommendations from the American Society of Echocardiography and the Society of Cardiovascular Anesthesiologists. *J Am Soc Echocardiogr*. **26**: 921–964.